REMARKS

Claims 22-32 are pending in the application. Claims 1-21 were previously canceled.

Applicants filed an Amendment under 37 C.F.R. § 1.116 on June 22, 2005. The Examiner issued an Advisory Action on July 12, 2005, indicating that no support could be found in the specification for the proposed amendment to Claims 23 and 29. The Amendment under 37 C.F.R. § 1.116 was not entered.

In the Amendment filed June 22, 2005, Applicants made an inadvertent error in the Ga composition ratio of a light-emitting layer in Claims 23 and 29.

Instead, Applicants submit this Amendment under 37 C.F.R. § 1.114(c), to correct the inadvertent error in amending Claims 23 and 29. Claims 23 and 29 are amended to recite "a $Ga_YIn_{1-Y}N$ ~~(0≤Y≤1)~~ (0.9≤Y≤1)light-emitting layer". Support can be found, for example, at page 13, lines 22-31 of the specification as originally filed. No new matter is added.

Entry of the present Amendment is respectfully requested along with reconsideration and review of the claims on the merits.

Formal Matter

Applicant appreciates the Examiner's acknowledgement of the Information Disclosure Statement filed on December 23, 2004.

Allowable Subject Matter

Applicant appreciates the Examiner's indication that Claims 22, 28 and 30 are allowed. The allowed claims are directed to a single hetero-junction device including a GaInN light-emitting layer and a GaNP lower clad layer. The Examiner states that within the context of

Claim 22 or Claim 28, "the single heterostructure consisting of a GaInN light emitting layer and a GaNP lower clad layer has not been found in the prior art."

Applicant submits that each of the pending Claims 22-32 is now allowable based on the amendment and the following remarks.

Summary of Examiner's Interview

Applicants appreciate the Examiner's Interviews. The Examiner provides a copy of an Interview Summary based on telephonic discussions with the Examiner on March 10 and 15, 2005.

The Examiner proposed an Examiner's Amendment to cancel Claims 23, 29, and 31, and to amend Claims 24-27 and 32 to remove their dependencies on cancelled Claim 23 (while retaining their dependence on allowed Claim 22), after which Claims 22, 24-28, 30 and 32 would be allowed.

However, Applicant's representative did not authorize cancelation of claims directed to the double hetero-junction device, as suggested by the Examiner, but instead requested an Office Action to clearly understand the Examiner's reasoning for rejection of these claims.

Claim Rejections - 35 U.S.C. § 103

A. Claims 23-27, 29 and 31 are rejected under 35 U.S.C. §103(a) as assertedly being unpatentable over Terashima et al (U.S. Pat. No. 6,069,021) in view of Ishida et al (U.S. Pat. No. 6,339,014), for the reasons of record.

The Examiner cites Terashima et al as teaching a group-III nitride semiconductor light-emitting device where the As compositional ratio (x) of the $GaN_{1-x}As_x$ lower clad layer is set to

obtain the lattice matching with the BP-based buffer layer.

The Examiner still recognizes that Terashima et al does not teach the lower clad layer to be a $GaN_{1-x}P_x$ lower clad layer instead of a $GaN_{1-x}As_x$ lower clad layer, because Terashima et al teaches doping the GaN layer with As. However, the Examiner maintains that it would have been obvious to use P instead of As for doping in view of Ishida et al, which is cited for teaching at least the equivalence of using P rather than As for the growing of n-type GaN layers. The Examiner maintains that given the use of P-doping in a prior step in Terashima et al, namely in the formation of the buffer layer, it would have assertedly been obvious to use the same dopant P, thus obviating the need for additional complexity in the manufacturing process, while the lattice matching achieved by selecting As as taught by Terashima et al and selecting x could have assertedly been equally straightforwardly achieved through doping with P (phosphorous).

B. Claim 32 is rejected under 35 U.S.C. §103(a) as assertedly being unpatentable over Terashima et al and Ishida et al as applied to Claim 23, and further in view of Prior Art as Admitted by Applicant. Particularly, the Examiner consideres that MOCVD is known to produce a GaN based light-emitting layer as a single crystal (page 1) except in the absence of lattice matching to an underlying substrate (page 2).

Applicant responds as follows.

As previously described, Claims 23 and 29 are amended to recite "a $Ga_YIn_{1-Y}N$ ~~$(0 \leq Y \leq 1)$~~ $(0.9 \leq Y \leq 1)$ light-emitting layer".

Claim 23 (double hetero-junction structure) includes all of the structural elements of claim 22 (single hetero-junction structure), except that previously claim 23 encompassed a GaN

light-emitting layer, whereas the single hetero-junction structure of claim 22 requires a GaInN light-emitting layer. This was the basic difference between claim 23 (rejected) and claim 22 (allowed), and the difference between claim 29 (rejected) and claim 28 (allowed).

In response Applicant amends claims 23 and 29 to require $0.9 \leq Y \leq 1$. When $0.9 \leq Y \leq 1$, a light-emitting layer having good lattice matching becomes a light-emitting layer having excellent crystallinity and in turn, a group-III nitride semiconductor light-emitting device capable of emitting high-intensity light is obtained (see page 13, lines 27-31).

The combination of Terashima with Ishida fails to render obvious the present invention, now requiring "a $Ga_YIn_{1-Y}N$ ($0.9 \leq Y \leq 1$) light-emitting layer".

Furthermore, Applicant submits that there is no reasonable basis for combining Terashima and Ishida et al in the manner suggested by the Examiner. Terashima only discloses phosphorus in PCl_3 as a source of phosphorus in forming Terashima's buffer layer. Although the Examiner believes that the motivation to replace As with P derives at least from the economic saving of using the P source already in use for the process of making the buffer layer in the device by Terashima instead of having to use the As source, and in addition from the obvious toxic nature of As, Applicant uses phosphine PH_3 as the source of phosphorus in forming the GaNP lower clad layer (see page 17, lines 1-5).

Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a).

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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